

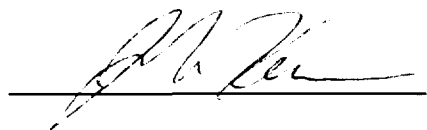
Five-Year Review Report

Second Five-Year Review Report for Microstorage / Intel Magnetics Superfund Site Santa Clara, CA

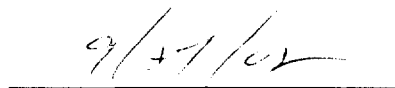
September 2002

Approved by:

Date:

A handwritten signature in black ink, appearing to read "J. Kemmerer", is written over a horizontal line.

**John Kemmerer, Chief
Site Cleanup Branch
Superfund Division
U.S. EPA, Region 9**

A handwritten date "9/17/02" in black ink is written over a horizontal line.

**California Regional Water Quality Control Board
San Francisco Bay Region**

Five-Year Review

**MicroStorage/Intel Magnetics
2986 Oakmead Village Court
Santa Clara, Santa Clara County, California**

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List of Acronyms

BGS	Below Ground Surface
BPHE	Baseline Public Health Evaluation
IM	Intel Magnetics
MSCA	Multi-State Cooperative Agreement
MSC	Micro Storage Corporation
MCL	Maximum Contaminant Level
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
SCR	Site Cleanup Requirement
VOC	Volatile Organic Compound

Executive Summary

The remedy for the MicroStorage/Intel Magnetics (MSC/IM) Superfund site in Santa Clara, California included groundwater extraction and treatment, groundwater monitoring, and institutional controls. The site achieved construction completion with the signing of the Preliminary Closeout Report on August 19, 1992. The trigger for this, the second five-year review, is the first five-year review.

The assessment of this five-year review found that the remedy continues to be protective. The groundwater extraction system has remained shut down since the last five-year review. The groundwater pollutant plume has remained stable with monitored natural attenuation. The remedy is expected to be fully protective with no restrictions on use required when the groundwater cleanup goals are achieved.

Five-Year Review Summary Form		
SITE IDENTIFICATION		
Site Name (from WasteLAN): Microstorage/Intel Magnetics		
EPA ID (from WasteLAN):		
Region: 9	State: CA	City/County: Santa Clara/Santa Clara
SITE STATUS		
NPL status: Final		
Remediation Status: Operating		
Multiple OUs? No	Construction completion date: 8/19/92	
Has site been put into reuse? No		
REVIEW STATUS		
Lead agency: State		
Author Name: David Barr		
Author title: Water Resource Control Engineer	Author affiliation: CA Regional Water Quality Control Board (Lead Agency)	
Review period: 7/10/02 – 9/13/02		
Date(s) of site inspection: 8/1/02		
Type of Review: (in bold) Post-Sara Pre-Sara NPL-Removal only Non-NPL Remedial Action Site x NPL State/Tribe-lead Regional Discretion		
Review number: (in bold) 1 (first) x 2 (second) 3 (third) Other (specify)		
Triggering action: (in bold) Actual RA Onsite Construction at OU#____ Actual RA Start at OU#____ Construction Completion x Previous Five-Year Review Report Other (specify)		
Triggering action date (from WasteLAN): 10/31/96		
Due Date (five years after triggering action date): 10/31/2001		

Five-Year Review Summary Form, continued

Issues:

The only issue identified during the review is the potential that offsite contamination is migrating onto the MSC/IM site. This does not affect current protectiveness but it could lengthen the time to achieve cleanup of groundwater.

Recommendations and Follow-up Actions:

It is recommended that additional investigation of a potential offsite source of VOC contamination that may be migrating onto the MSC/IM site be done. A research of the upgradient properties should be conducted to see if there are any sites with known VOC groundwater pollution. A well survey should be performed to determine what existing upgradient wells may be available for sampling.

Protectiveness Statement:

The remedy is currently protective through the use of institutional controls. Upon the achievement of groundwater cleanup goals the remedy is expected to be protective with unrestricted use.

**California Regional Water Quality Control Board
San Francisco Bay Region**

Five Year Review

**MicroStorage/Intel Magnetix
2986 Oakmead Village Court
Santa Clara, California**

I. Introduction

This report is the second five-year review for the MicroStorage/Intel Magnetix Site. The California Regional Water Quality Control Board, San Francisco Bay Region, conducted this review pursuant to the Multi-Site Cooperative Agreement (MSCA) between the U.S. EPA Region IX and the Regional Board. The purpose of a five-year review is to ensure that a remedial action remains protective of public health and the environment and is functioning as designed. The five-year review is required because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Site developed from agricultural land to a business park	1979
Groundwater contamination discovered at the IM Site	1982
Intel submits completed Regional Board facility questionnaire	6/16/1982
An underground tank which was a source of contamination on the IM site is removed along with 35 cubic yards of soil.	7/1985
Regional Board adopts NPDES Permit No. CA0028941 (Order No. 86-014) for the discharge of treated extracted groundwater at the IM site. Groundwater extraction and treatment begins.	3/19/1986
IM site is added to the NPL	5/1986
Kim Camp III submits its tenants' Hazardous Chemical Use History Reports	2/2/1987
The MSC Site is identified as being a primary source of groundwater contamination.	1988
EPA changes the name of the site from IM to the combined MSC/IM site.	10/12/1988
Regional Board adopts Order No. 89-017 issuing Site Cleanup Requirements to MSC and Kim Camp III	2/15/1989
Regional Board adopts Order No. 89-086 approving the RI/FS workplan	3/17/1989
Regional Board adopts NPDES Permit No. CA0029670 (Order No. 90-040) for the discharge of treated extracted groundwater from the combined	3/21/1990

MSC/IM site. Groundwater extraction and treatment from the expanded extraction system begins.	
Regional Board adopts Order No. 91-119, the Final Site Cleanup Requirements for the combined MSC/IM site.	7/17/91
Regional Board allows the groundwater extraction system to be shut down in response to a significant decline in contaminant removal rates and continuing equipment problems. A trial of monitored natural attenuation is begun.	4/1995
First Five-Year Review	10/31/96

III. Background

Physical Characteristics

The MicroStorage Corporation/Intel Magnetics (MSC/IM) Site is approximately one acre in size and is located on Oakmead Village Court between Kifer Road and Central Expressway in the City of Santa Clara, California. The site consists of two separate facilities that are adjacent, the former MicroStorage Corporation and the former Intel Magnetics, which have a commingled groundwater pollutant plume. Santa Clara is a city of 95,200 and is part of the San Francisco Bay Metropolitan Region which has a population of about six million. The Site is located in a light industrial and commercial area that is dominated by the electronics industry. It is in the area known as Silicon Valley, home to numerous computer related companies. Most buildings in the area are low rise developments containing office space and research and development facilities. The Site is currently in use as office space.

Hydrogeology

Groundwater flows to the northeast towards San Francisco Bay. The Site is located in the Santa Clara Valley, a structural basin filled with marine and alluvial sediments. The coarser deposits are probably the result of deposition in or near stream channels that drain the highlands that surround the basin. Finer grain deposits result from a variety of conditions with the eventual result of a heterogeneous sequence of interbedded sands, silts, and clays. Municipal water supply wells tap an extensive deep regional confined aquifer that lies generally greater than 200 to 300 feet below ground surface (BGS). A thick, relatively impermeable aquitard separates this deep confined aquifer from a complex series of discontinuous aquifers and aquitards that can extend up to within a few feet of the ground surface. Two distinct water bearing zones have been investigated at this site. They are 1) the first encountered water bearing zone, called the A-zone is found from 10 feet BGS to 20 feet BGS; 2) the next encountered water bearing zone is called the B-zone and is found from about 30 to 40 feet BGS. The two zones are separated by a two to ten foot thick aquitard composed of clay to silty sand. There could be some hydraulic connection between the two zones due to the discontinuous nature of the

sediment types. Contamination is confined to the A-zone. The groundwater contaminant plume is approximately 800 feet long and 300 feet wide.

History of Contamination

There are two separate sources of contamination at the MSC/IM Site. An underground solvent tank formerly on the Intel Magnetix site is the source of a solvent discharge to groundwater. A chemical storage area on the MicroStorage site is believed to be the source area for solvents on the MicroStorage site. Groundwater flows from the MicroStorage site across the Intel Magnetix site. The two contaminant plumes have thus become commingled. Groundwater contamination was first discovered in 1982 when groundwater samples were collected adjacent to the solvent storage tank at the Intel Magnetix site as part of a leak detection program for underground tanks initiated by the Regional Board in the South Bay Area.

Initial Response

In 1982 Trichloroethylene (TCE), Trichloroethane (TCA), and Freon were identified in groundwater samples taken adjacent to the underground solvent storage tank at the Intel Magnetix site. The Regional Board required a groundwater investigation to determine the extent of groundwater contamination. In May 1986 Intel Magnetix was placed on the National Priority List (NPL). A 1988 technical report prepared by a consultant under contract to U.S. EPA concluded that a primary source of VOC contamination is indicated at the MicroStorage facility where maximum levels of TCE, TCA, and Freon 113 are found. The report also concluded that a secondary source of Freon 113 and possibly TCA exists at the Intel Magnetix site. In 1988 U.S. EPA changed the name of the Superfund Site from the Intel Magnetix Site to the combined MicroStorage/Intel Magnetix Site. Since then, the site has been regulated as one combined Superfund site.

The underground solvent storage tank on the Intel Magnetix site was removed along with 35 cubic yards of soil in July 1985. Between 1986 and 1990 Intel extracted and treated groundwater from two extraction wells on the Intel Magnetix site. In January 1991, Kim Camp III, the property owner of the MicroStorage site, began operation of an expanded groundwater extraction and treatment system on the MicroStorage site. This system pumps water from one of the Intel Magnetix extraction wells and from three extraction wells on the MicroStorage site.

Summary of Basis for Taking Action

The site overlies the Santa Clara Valley groundwater basin. Groundwater from this basin provides up to 50% of the municipal drinking water for over 1.4 million residents of the

Santa Clara Valley. The combined MSC/IM site was made a Superfund site primarily because of the past chemical releases' potential threat to this valuable resource.

IV. Remedial Actions

Remedy Selection

A Baseline Public Health Evaluation (BPHE) was submitted May 1, 1990. The Remedial Investigation/Feasibility Study (RI/FS) was submitted on January 9, 1991. These documents form the basis of the remedial action plan. The Regional Board adopted Final Site Cleanup Requirements (SCRs), Order No. 91-119, for the site in July 1991. The Final SCRs contain the approved remedy for cleanup at the site. The alternative that selected in the SCRs as the final cleanup plan consisted of: 1) a deed restriction prohibiting the use of shallow groundwater, 2) groundwater monitoring, 3) groundwater pumping from the A-zone, 4) treatment of extracted groundwater with activated carbon and discharge of the treated groundwater to the storm drain under an NPDES permit. The U.S. EPA signed the Record of Decision for the MSC/IM Site on September 25, 1991.

The SCRs set cleanup standards at California proposed or adopted Maximum Contaminant Levels (MCLs), EPA MCLs, California Action Levels, or levels based on a risk assessment. These cleanup levels are:

Chemical	Cleanup Standard (ug/l)
Chloroform	100
1,1-dichloroethane (1,1-DCA)	5
cis-1,2-dichloroethene (cis-1,2-DCE)	6
trans-1,2-dichloroethene (trans-1,2-DCE)	10
1,1-dichloroethene (1,1-DCE)	4
Freon 113	1,200
methylene chloride	40
tetrachloroethene	5
toluene	40
1,1,1-trichloroethane (1,1,1-TCA)	200
1,1,2-trichloroethane (1,1,2-TCA)	32

trichloroethene (TCE)	5
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Remedy Implementation

The groundwater extraction and treatment system and groundwater monitoring program were fully implemented at the time SCRs were adopted. The deed restriction has been finalized and recorded. Groundwater was extracted and treated until April 1995 at which time the Regional Board approved the shut down of the groundwater extraction system with continued groundwater monitoring.

Systems Operation/O&M

The groundwater extraction system was shut down in 1995. The system has not been operated since then. There is a semi-annual groundwater monitoring program wherein groundwater elevations and flow direction is determined and monitoring wells are sampled for VOCs. Semi-annual reports are submitted to the Regional Board.

Costs associated with operation and maintenance of the groundwater system have declined due to the shut down of the extraction and treatment system. The cost incurred during the period of 1990 through 1995 for extraction and treatment of groundwater, including capital costs for the system, annual operation and maintenance costs, and groundwater and NPDES monitoring totaled \$404,535. Costs incurred from 1995 through 2001 totaled \$72,445.

V. Progress Since Last Review

When the groundwater extraction and treatment system was shut down, it was recognized that it was no longer removing significant amounts of VOCs. It was also recognized by the Regional Board that there were limits to existing treatment technologies, and that achievement of drinking water standards may not be achievable in the short term through active remediation. Monitored Natural Attenuation was allowed at this site to see what effect this would have on the pollutant plume. The pollutant plume has stayed stable and since shutdown of the treatment system, VOC levels have been generally stable or decreasing. One exception to this is monitoring well MW-1. Well MW-1 has historically been non-detect for VOCs, however beginning in 1999 TCE was detected in this well. There has been a gradual increase in the TCE concentration. Well MW-1 is at the upgradient edge of the MicroStorage site, and there is no known source of contamination in that area that could account for the presence of TCE in the well. It appears that the TCE is migrating from an upgradient, offsite source. If TCE is migrating onto the site from upgradient, this could ultimately effect the cleanup at the MSC/IM site.

No interviews were conducted during this five-year review other than routine follow-up questions of the consultant performing the cleanup at the site regarding activities at the site. Contamination at the site is confined to groundwater. Current use of the site is as

office space. It was felt that interviews of tenants at the site were unnecessary as there are no surface controls or other features accessible to the public.

No issues were identified in the previous five-year review and the remedy was found to be protective of human health and the environment.

VI. Five-Year Review Process

Document Review

This five-year review consisted of a review of relevant documents including MSC/IM's 2002 five-year status report, groundwater monitoring reports, and annual reports. Applicable groundwater cleanup standards contained in the Final Site Cleanup Requirements were reviewed. There have been no changes in the cleanup standards contained in the Cleanup Requirements.

Data Review

Groundwater monitoring data collected from 1989 to 2001 were reviewed to evaluate the groundwater pollutant plume and how the plume has behaved under the no pumping conditions that have been in place since 1995. The expanded groundwater extraction system that came online in 1991 was successful in removing VOC mass and reducing concentrations of VOCs in groundwater. After several years of groundwater extraction however, the amount of VOC mass being removed had declined considerably and VOC concentrations in groundwater seemed to be stabilizing. This phenomenon of an initial significant reduction in VOC concentrations followed by a leveling off of the reduction in VOC concentrations has been found to occur at many other sites in the area and around the country. In April 1995 the Regional Board approved a request by the primary responsible party to leave the groundwater extraction shut down and see whether the pollutant plume would remain stable and if monitored natural attenuation could be an effective method of remediation. The groundwater extraction system has remained shut down since then and the site has been monitored to ensure the plume is not migrating and to determine the effectiveness of natural attenuation.

The evaluation of natural attenuation at the site was achieved by evaluating four indicators that are recommended in the use of "Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites" (Office of Solid Waste and Emergency Response Directive No. 9200.4-17P, April 21, 1999) for evaluating the performance of monitored natural attenuation. The four indicators are:

- Demonstrate that natural attenuation is occurring according to expectations;

- Detect changes in environmental conditions that may reduce the efficacy of the natural attenuation processes;
- Identify any potentially toxic or mobile transformation products; and
- Verify that the plume is not expanding either downgradient, laterally, or vertically.

A review of the monitoring well data shows that in general the groundwater pollutant plume has remained stable since the pumps were turned off and groundwater extraction ceased. The wells at the downgradient end of the plume have remained at either non-detect or at less than the 5 ug/l cleanup standard for TCE since 1989. There have been no increases in chemical concentrations in these wells and thus, the pollutant plume has not expanded downgradient.

Data from wells in the interior of the plume in the source area are more variable. In general concentrations of contaminants have remained stable or decreased. However, in a few wells, concentrations have increased and then stabilized in the period since the last five-year review. Currently, the highest concentration of TCE in the interior of the plume is 120 ug/l. The highest concentration of 1,2-DCE is 8 ug/l. This is down from concentrations of TCE and 1,2-DCE of 1,400 ug/l and 65 ug/l respectively before the expanded extraction system came online. Those wells that were inside the area of influence of the pumping wells and which have had increases have not returned to prepumping concentrations. The significant reduction in contaminant concentrations, which occurred in the first few years of groundwater extraction, has remained.

It was expected that the plume concentrations would slowly decrease through the processes of natural attenuation. As discussed above the behavior of the plume has been variable. There has also been an appearance of VOCs in upgradient well MW-1. This well was historically non-detect for VOCs. Beginning in 1996 however, there was a detection of TCE and 1,2-DCE in well MW-1. There has been a gradual increase in the levels of these VOCs in well MW-1. Concentrations have been widely variable ranging from 45 to over 200 ug/l in the last couple of years. Well MW-1 is located on the upgradient edge of the MSC/IM site. It is upgradient of the pollutant source area and there are no known sources of VOC contamination in the area of well MW-1. The most likely explanation for the appearance of VOCs in well MW-1 is that VOCs from an upgradient source are migrating onto the MSC/IM site. If this is the case, it could effect the cleanup at the MSC/IM site. An investigation into the source of the VOCs appearing in well MW-1 should be carried out. Preliminary sampling of existing upgradient wells on the adjacent property has been non-detect.

Methyl-tertiary butyl ether (MTBE) was detected at low levels in ten monitoring wells in the September 2001 sampling and again in the March 2002 sampling. MTBE has not previously been detected at the site. MTBE is an additive to gasoline and is a contaminant associated with leaking underground gasoline storage tanks. There is no known source of MTBE at the site. It is believed to be migrating onto the site from upgradient. Concentrations of MTBE are low, less than 3 ug/l. The drinking water MCL for MTBE in California is 13 ug/l.

Environmental conditions at this site are similar to conditions at other, nearby sites where natural attenuation is effective in reducing VOC concentrations. Natural attenuation has been effective in containing the plume at the MSC/IM site, however, as described above offsite contamination may be contributing to increases in VOC concentrations at the upgradient area of the plume.

No potentially toxic or mobile transformation products have been identified during sampling that were not already present at the time of the Record of Decision, and therefore have cleanup standards specified in the Site Cleanup Requirements.

The plume has not expanded in area since the last five-year review. Contamination remains confined to the shallowest aquifer and has not migrated vertically.

Site Inspection

A site inspection was conducted on August 1, 2002 by Regional Board Staff. No activities that could interfere with cleanup of the site were observed. The institutional controls that are in place include prohibitions on the use of groundwater until cleanup levels are achieved. No activities were observed that would have violated the institutional controls. The site consists of single story office buildings, parking lots, and landscaping. VOC contamination is confined to groundwater.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

As discussed previously the groundwater extraction and treatment system was shut down at this site in 1995. The reasons for the shut down were detailed in the first five-year review and summarized in this five-year review. The efficiency of VOC removal through groundwater extraction had declined considerably. The Regional Board approved a request by the Kim Camp III to shut down the groundwater extraction system and go with groundwater monitoring only to see if natural attenuation could successfully contain and remediate the pollutant plume.

The plume has not expanded in size since the groundwater extraction system was shut off. Downgradient monitoring wells have remained at non-detect or below the cleanup level. The plume has not migrated vertically and contamination remains confined to the shallowest groundwater bearing zone. Some wells in the interior of the plume have experienced increases in VOC concentrations since the groundwater extraction system was shut down. These increases have since stabilized. Concentrations remain well below the initial high levels present prior to the beginning of groundwater extraction. Upgradient monitoring well MW-1 which was historically non-detect for VOCs has had variable concentrations of VOCs in the last several years. It appears that an upgradient source of VOC contamination may be migrating onto the MSC/IM site. Preliminary

sampling of monitoring wells on the upgradient property has been non-detect. Additional investigation is recommended to determine the source of VOCs.

The current groundwater monitoring program is sufficient to track the plume and detect any migration beyond the current plume boundaries, as well as track the effectiveness of monitored natural attenuation in remediating the VOC plume. Kim Camp III has requested that the monitoring program be reduced from semi-annual to annual monitoring. Given the uncertainties regarding the increase in VOC concentrations at the upgradient end of the plume it is recommended that the current semi-annual monitoring program be retained.

There were no opportunities for system optimization observed during this review. Cyclic pumping has been tried on similar nearby sites with similar contaminant histories. It has not been effective in increasing the efficiency of VOC removal. The existing monitoring well network provides sufficient data to assess the progress of natural attenuation.

The institutional controls in place include prohibitions on the use of groundwater until cleanup levels are achieved. No activities were observed that would have violated the institutional controls.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

There have been no changes to the physical conditions of the site that would affect the protectiveness of the remedy. The use of the site remains commercial and office space.

There have been no changes to Applicable, Relevant, and Appropriate Requirements for the site and no new standards that would affect the protectiveness of the remedy. Currently, only TCE and 1,2-DCE exceed the cleanup standards.

The exposure assumptions used to develop the Human Health Risk Assessment were for potential future exposure if untreated groundwater were to be used for drinking water and if residential uses were to occur on the site. There have been no changes to the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. These assumptions are considered to be conservative in evaluating risk and developing risk-based cleanup levels. Institutional controls prohibit the use of groundwater and groundwater is not currently used at the site. The land use of the site is commercial/industrial. No changes to the assumptions, or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could effect the protectiveness of the remedy. The Regional Board has developed risk-based screening levels for a variety of exposure routes including vapor intrusion into buildings from underlying groundwater contamination. The current levels of TCE and 1,2-DCE in groundwater at the site are below the screening levels for potential indoor air risk for both a commercial/industrial and residential use scenario.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No new information has been identified that could effect the protectiveness of the remedy. Potential migration of contaminants from offsite onto the MSC/IM site could potentially effect the time to achieve cleanup standards, however, the increases in VOC levels seen in the upgradient boundary well do not currently affect the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed and the site inspection, the remedy is functioning as intended by the Record of Decision as modified by Regional Board approval of shut down of the groundwater extraction system. There have been no changes in the physical condition or land use of the site that would effect the protectiveness of the remedy. Most of the cleanup standards have been met, however TCE and 1,2-DCE still exceed cleanup standards. There have been no changes in the toxicity factors for the contaminants of concern that were used the baseline risk assessment, and there have been no changes to the standardized risk assessment methodology that could effect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

The only issue identified during the review is the potential that offsite contamination is migrating onto the MSC/IM site. This does not affect current protectiveness but it could lengthen the time to achieve cleanup of groundwater.

IX. Recommendations and Follow-up Actions

It is recommended that additional investigation of a potential offsite source of VOC contamination that may be migrating onto the MSC/IM site be done. A research of the upgradient properties should be conducted to see if there are any sites with known VOC groundwater pollution. A well survey should be performed to determine what existing upgradient wells may be available for sampling. Based on this information a sampling plan can be created and carried out. The Regional Board will be the oversight agency responsible for the investigation. The target date for completion will be January 30, 2003.

X. Protectiveness Statement

Because the remedial actions at the site are protective, the site is protective of human health and the environment. It is expected that it may require ten years to achieve cleanup goals. In the interim, ingestion of contaminated groundwater is the only exposure

pathway that could result in unacceptable risks. This pathway is being controlled through institutional controls prohibiting the use of groundwater.

The risk assessment performed for the site in the BPHE identified inhalation of vapors from underlying groundwater in a residential use scenario as a potential exposure pathway that could result in unacceptable risk. However, groundwater VOC levels have been reduced such that the current levels of TCE and 1,2-DCE in groundwater at the site are below the screening levels for potential indoor air risk for both a commercial/industrial and residential use scenario.

The existing monitoring well network and sampling program is sufficient to track the stability of the plume and the progress of natural attenuation in remediating the groundwater contamination.

XI. Next Review

The next five-year review for the MSC/IM Superfund Site is required by September 2007.